

CLAIMS:

1. A waveguide type optical device including a first optical waveguide disposed on a substrate, a second optical waveguide that is disposed on the substrate and intersects the first optical waveguide, and a groove that is disposed at an intersection position of the first optical waveguide and the second optical waveguide and is for controlling optical paths of the optical waveguides, said waveguide type optical device comprising:

an insert plate disposed to be insertable into the groove;

means for applying a static magnetic field such that a vector product of a velocity vector of the insert plate and its magnetic field vector is nonzero;

a cantilever that has electrical wiring including therein a wiring part lying in a direction perpendicular to both the velocity vector and the magnetic field vector and that supports the insert plate; and

means for detecting a relative position of the insert plate to the groove by detecting a current induced in the electrical wiring.

2. The waveguide type optical device according to claim 1, wherein the groove is filled with a liquid having the refractive index being matched to the refractive index of the optical waveguides.

3. The waveguide type optical device according to claim 1, wherein the insert plate has a reflecting surface and selects either an optical path from an input port of the first optical waveguide to an output port of the first optical waveguide or an optical path from the input port of the first optical waveguide to an output port of the second optical waveguide.

4. The waveguide type optical device according to claim 1, wherein an impressed current for giving the Lorentz' force to drive the cantilever is flowed in order to insert the insert plate into the groove.

5. The waveguide type optical device according to any one of claim 1 through claim 4, wherein the means for applying the static magnetic field includes a sheet magnet having dimensions and a shape whose image projected onto the optical waveguide from a vertical direction can fall in a surface of the optical waveguides.

6. The waveguide type optical device according to any one of claim 1 through claim 4, wherein the means for applying the static magnetic field includes a sheet magnet and said magnet is disposed so that a running direction of a straight line part of an outline projected onto the optical waveguides from a vertical direction is not at right angles to a

direction of a magnetic field generated by the magnet.

7. A position detecting method for detecting a relative position of an insert plate that is disposed to be insertable
5 to a groove used for controlling optical paths of optical waveguides arranged on a substrate with respect to the groove, said method comprising:

applying a static magnetic field such that a vector product of a velocity vector of the insert plate and its
10 magnetic field vector is nonzero;

applying a driving force on a cantilever supporting the insert plate for a predetermined time, said insert plate has electrical wiring including therein a wiring part lying in a direction perpendicular to both the velocity vector
15 and the magnetic field vector;

detecting a current induced in the electrical wiring;
and

detecting a relative position of the insert plate to the groove.

20